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ABSTRACT

This report provides a summary and analysis of activities and trends of virtual schools (i.e., educational organizations that offer K-12 courses through Internet- or World Wide Web-based methods) across the United States. The study provides analysis of trends based on an online survey of state-approved or regionally accredited schools conducted from July through August 2001. A peer group of 44 virtual schools was surveyed, with e-mail and telephone follow-up. Virtual school profiles are presented for: state-sanctioned state-level virtual schools; college and university-based virtual schools; consortium and regionally-based virtual schools; local education agency-based virtual schools; virtual charter schools; private virtual schools; and for-profit providers of curricula, content, development tools, and infrastructure. Highlights include: (1) the trend from virtual high schools to virtual K-12 schools continues; (2) $300 per semester was the most reported tuition, but prices varied greatly; and (3) calculus AB was the online AP (advanced placement) course offered by the most schools. Several context factors influencing the development of virtual schools are summarized, including demographic factors, public perceptions, education market forces, technology access, curriculum equity, and government policies and actions. The virtual school list is appended. (Contains 14 references.) (MES)

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Virtual Schools:

Trends and Issues

A Study of Virtual Schools in the United States

October 2001

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EXECUTIVE SUMMARY

This report provides a summary and analysis of virtual school activities and trends across the United States. The virtual school movement can be considered the "next wave" in technology based K-12 education, joining proven distance learning delivery methods. Virtual schools are defined for the purposes of this study as educational organizations that offer K-12 courses through Internet- or Web-based methods.

The results of a March 2000 study, *Virtual High Schools: State of the States*, informed planning for this revised and updated edition, as did other recent studies of virtual schools. While the March 2000 study focused on state-level, state-sanctioned virtual schools, the present study looks more broadly at the different types of virtual schools.

This study provides analysis on trends based in part through an online survey of state approved or regionally accredited schools conducted from July through August 2001. A peer group of 44 virtual schools was surveyed, with email and telephone follow-up conducted to reach a response rate of 75% (N=33). Highlights of this online survey include:

- The trend from 'virtual high schools' to 'virtual K-12 schools' continues
- $300/semester was the most reported tuition, but prices varied greatly
- Calculus AB was the online AP course offered by the most schools

Based on extrapolations from this survey, a "ballpark estimate" was reached that 40,000 to 50,000 K-12 students will enroll in an online course in 2001-2002.

At least 14 states have a planned or operational state-sanctioned, state-level virtual school in place. Other types of virtual school organizations include: university-based virtual schools; virtual school consortia; virtual schools operated by schools and districts; virtual charter schools operated by state-chartered entities; and virtual schools operated by private school entities. The study also looks at for-profit providers of curricula, content, development tools and infrastructures.

Recommendations are provided for planners considering the establishment of virtual schools. A comprehensive listing of known virtual schools is appended to the study. The study, including the online peer survey results and the listing of virtual schools, is available online at http://www.dlrn.org/virtualstudy.html.

Examples of Virtual Schools

State-sanctioned, state-level. In at least 14 states, entities can be identified that have been sanctioned by state government to act as the state's "own" virtual school. The two newest ones, in Idaho and Maryland, have not yet been launched..

- **Example:** The **Florida Virtual School** (previously the Florida Virtual School), begun in 1997, has been state funded as an independent entity. It offers a full online curriculum but not a diploma. The largest virtual school in terms of enrollments, it acts as a course provider for districts in Florida and other states.

College and university-based. Some university independent study high schools and video-based continuing education programs have taken their K-12 courses online. Virtual colleges and universities make hundreds of their introductory college-level virtual courses available to upper division high school students through dual or concurrent enrollment, a phenomenon not studied in depth here.

- **Example:** The **University of Nebraska-Lincoln** Independent Study High School developed CLASS online diploma program courses with a federal grant, marketed through the for-profit CLASS.com, and is now creating its own new courses.

Consortium and regionally-based. A number of virtual school consortia have been created. Virtual school consortia are national, multi-state, state-level and regional in nature. Many regional education agencies have added virtual K-12 courses to their service menus for schools. Most virtual school consortia act as brokers for external provider opportunities or share courses among members.

- **Massachusetts**. The nonprofit VHS Inc. (formerly Concord VHS) is the most successful collaborative or barter model of virtual schools in existence, seeking sustainability through its broad network of participating schools.

Local education agency-based. A large number of local public schools and school districts have created their own virtual schools, mainly to serve their own supplemental or alternative education needs and to reach out to home school populations. They usually employ their own regular certified K-12 teachers, either within the regular course of instruction, or "on the side."

- **Example:** The **HISD Virtual School** in Houston offers middle school curricula for enrolled and home school students, and AP courses to supplement its high school offerings, while **Mindquest** is a Bloomington (MN) public schools program offering interdisciplinary project-based courses for persons 17 or older, for remedial work, GED Fast Track and regular high school diplomas

Virtual charter schools. State-chartered entities including public school districts, nonprofit and for-profit organizations operate public charter schools exempt from some rules and regulations. Charter school legislation has a major impact on how these schools operate.

- **Example: Basehor-Linwood Virtual Charter School** in Kansas focuses on providing state-funded public education opportunities for K-12 home schoolers across the state. Founded in 1998, it delivers self-developed courses in a full diploma program, using a certified district teacher in each elementary grade level and secondary content area.

Private virtual schools. Like local public schools, many private schools have developed virtual school programs. Their programs are mainly designed to provide supplemental courses and instructional materials for home schoolers. A limited number offer state-approved or regionally accredited high school diplomas, including Keystone National High School, Laurel Springs school, and WISE Internet High School.

- **Christa McAuliffe Academy** in Washington state has offered Internet-based K-12 learning since 1995. Student cohorts meet weekly with their mentor in an online virtual classroom meetings, and students also undertake online mastery-based learning curricula facilitated by CMA mentors and developed by external providers. The school has regional accreditation, state approval and is seeking cross-regional approval through the Commission on International and Transregional Accreditation (CITA).

For-profit providers of curricula, content, tool and infrastructure. Many for-profit companies have played an important role in the development of virtual schools. Companies such as **Apex Learning** and **Class.com** have provided "starter" courses for many new virtual school efforts. **Blackboard** and **eCollege** have provided delivery platforms used by many virtual schools. Many companies are expanding their original focus, offering expanded curricula or comprehensive services to meet the needs of this growing market. Web development software companies such as Macromedia have provided the tools used by virtual schools to self-develop courses.

Building on the previous study (Clark, 2000), some key characteristics of virtual schools are presented in **Summary and Recommendations,** according to eight aspects of virtual high school organization: funding, technology; curriculum; teaching; student services; assessment; policy and administration; and marketing and public relations. Based on an analysis of virtual school activities and trends, recommendations are made at the end of this study in these key areas, for virtual school planners.

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INTRODUCTION

This study is intended to provide insights into activities and trends of K-12 virtual schools in the United States. The study includes **Survey Results** from a recent online survey of a peer group of 33 virtual schools, **Virtual School Profiles** across the range of virtual school types, and a brief review of **Context Factors**. A **Summary and Recommendation** section provides a brief summary of virtual school characteristics and a list of recommendations for planners.

The results of a March 2000 study, *Virtual High Schools: State of the States*, informed planning for this revised and updated edition. While the March 2000 study focused on state-level, state-sanctioned virtual schools, the present study looks more broadly at the different types of virtual schools. A number of other studies and online resources created since then were also reviewed

The present study provides brief **Virtual School Profiles** illustrating the different kinds of virtual schools that have been identified, and a **Virtual School List** in Appendix A that focuses on identifying, organizing and providing non-annotated links to identified virtual K-12 schools currently in operation. The Virtual School List is also maintained and updated online at http://www.dlrn.org/virtual.html. With the rapid growth of the field, maintaining such lists is becoming an increasingly challenging venture.

Definitions

The terms "virtual high school" and "virtual school" have become buzzwords, frequently applied to any K-12 learning activity or program that uses the Internet or other technologies. If you ask 30 people to define a "virtual school," you will probably get 30 different answers. A "virtual school" is here defined as "an educational organization that offers K-12 courses through Internet- or Web-based methods." Virtual K-12 education is a form of distance education. Distance education might be formally defined as "formal education in which a majority of instruction occurs while teacher and learner are separate" (Verduin and Clark, 1991), It includes delivery methods such as independent or correspondence study, as well as videoconferencing and other instructional technologies.

In the following section, results of a new online survey of a peer group of virtual schools are presented.

SURVEY RESULTS AND ANALYSIS

Highlights of Results:

- The trend from 'virtual high schools' to 'virtual K-12 schools' continues
- An estimated 40,000 to 50,000 students will enroll in a virtual school course in 2001-2002
- The most common tuition reported was $300/semester, but prices varied greatly
- Calculus AB was the online AP course offered by the most schools

Some key characteristics of virtual schools were studied through literature review, web searches, and an online survey of a peer group of virtual schools. Methods, results and analysis are presented in this section.

Methodology

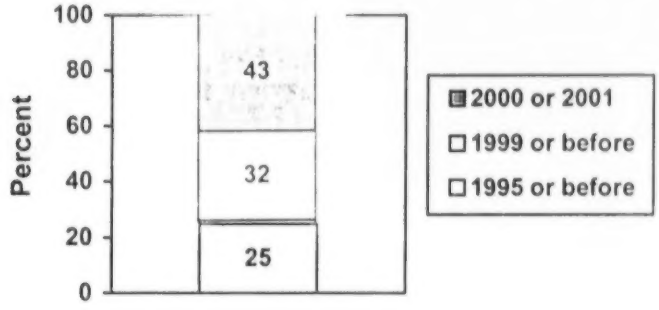
The online survey was conducted from July through August 2001. Because of difficulties in identifying every virtual school effort in the United States, a peer group approach was used. A total of 44 virtual K-12 schools were identified to include in this peer group, through web research, literature review and personal contacts. All 44 were operational in 2000-2001, held regional accreditation or state-approval as K-12 educational entities, and offered at least a partial curriculum through Internet or web-based instruction. A few additional schools meeting these criteria were located, but they were not included in the peer sample because an individual representative could not be identified for email contact. Additional schools meeting these criteria became apparent through ongoing revisions to the Virtual School List through September. It is likely that the smallest programs are underrepresented in the peer group.

Initial survey contact was through a personalized email describing the study and giving the online survey link. A range of methods were employed to attain a high completion rate, given the problems with obtaining survey compliance frequently reported for online surveys. Two follow-up personalized emails reminded non-completers about the survey. As an added inducement, the Distance Learning Resource Network (DLRN) at WestED offered responding schools a chance to win a free registration at the CiTE Virtual High School Symposium in October 2001, and subsequently awarded these registrations to several schools. Telephone follow-up was conducted by DLRN staff. These multiple methods helped achieve a response rate of 75% (N=33). This high response rate means that the results of the survey can be considered representative of the likely responses of the peer group as a whole (N=44).

General Characteristics of Virtual Schools Surveyed

Beginning of operations. More of the peer group virtual schools reported beginning their operations in 2000 or 2001 (43%) than in the previous four years combined. A surprising one in four said that they began operating in 1995 or before. While some of these may have responded in terms of when they started planning rather than instruction, many citing early start dates appear to be referring to pilots of early Internet-based instruction, or dial-up client server applications. Some of these organizations previously offered computer-assisted instruction as part of independent study packages, and gradually transitioned to online or Internet delivery.

Virtual School Start Dates



Statement of mission, vision, purpose. Peer group representatives were also asked to briefly state the vision or main purpose for establishing their virtual school. Their statements showed a variety of purposes. One purpose many schools share is to expand access to high quality or rigorous curricula. For example, the West Virginia Virtual School was created "to offer high quality educational courses via Internet technology to students, regardless of school size or location." Some sought to serve very rural areas, like seeUonline.org in Palmer, Alaska, which serves a school district "the size of West Virginia but with only one main highway."

About one in four specifically mentioned high school education. The Electronic High School in Utah was charged in 1994 to "provide every secondary core course electronically to every student in the state." The Cumberland County Schools Web Academy was originally designed to assist struggling students, but now seeks to serve all kinds of learners.

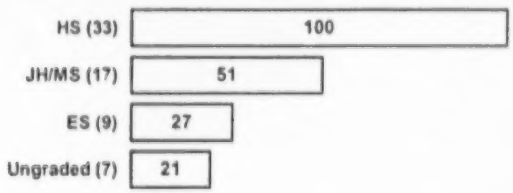
> "The mission of the Virtual School is to allow for two way interactive learning anytime anywhere for any student."
>
> --Houston Independent School District

Several responding virtual schools serve special learner groups, such as Stanford's EPGY, which according to Deputy Director Ray Ravaglia, seeks to "provide gifted students with an education comparable in content and quality to that provided by the best schools in the world." UC College Prep Initiative (UCCP) provides online college preparatory courses to high school students for

the express purpose of increasing their eligibility for admission to top-flight universities. Part of Mindquest's mission is to "provide a bridge for students who left high school before graduating," says Coordinator Julie Williams. Some make clear that they do not seek to compete with public schools, like the University of Texas at Austin High School Program, whose mission is "to serve students who cannot attend a regular high school in their home area." Other seek to provide an alternative, like JeffcoNet Academy in Colorado, whose vision in part, according to Online Coordinator John Adsit, is to provide "to meet the needs of a variety of students who could not be readily accommodated through the traditional classroom."

Grade levels. Peer schools were asked to indicate for which grade levels their courses were designed. All said they offered courses intended for high school students. A surprising number (51 %) indicated that junior high and middle school grade courses were offered as well. This continues a trend noted in the previous study (Clark, 2000) toward online schools focusing on all of K-12, not just high school instruction. About one if four schools indicated they currently offered courses across the entire K-12 spectrum.

Grade levels for which courses offered were designed



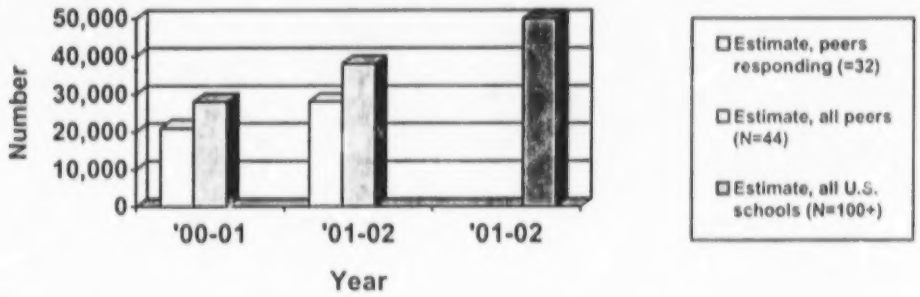
Enrollments. Keith Oelrich, CEO of Apex Learning, a leading provider of online AP courses, estimates that about 30,000 high school students have taken a course online. Clearly, the number people want to hear is an unduplicated count, where each student is counted once. But getting there is not easy. One of our goals was to try to estimate the scope of K-12 virtual learning. through enrollment figures and other methods.

The enrollment estimates that follow should be considered "ballpark" estimates only. There were several issues with obtaining accurate enrollment counts in the online survey (see Details on Methods at the end of this section). Interestingly, the figures Oelrich cites for high school only are similar to the estimated figures derived from responses by our peer group to questions about 2000-2001 enrollments for all of K-12.

The peer group schools were asked to report their overall enrollments by year. Based on the counts provided by schools it appears that about 21,000 individual students enrolled in a virtual course through the 32 responding schools in 2000-2001, and around 28,000 were anticipated to enroll in a course in 2001-2002. Extrapolation would suggest enrollments of around 38,000 in all 44 peer schools in 2001-2001. Adding enrollments at additional schools identified subsequently outside the peer survey group brings the total to the mid-40,000 range. There is no way to hypothesize on the numbers or enrollments of additional small state-approved or regionally

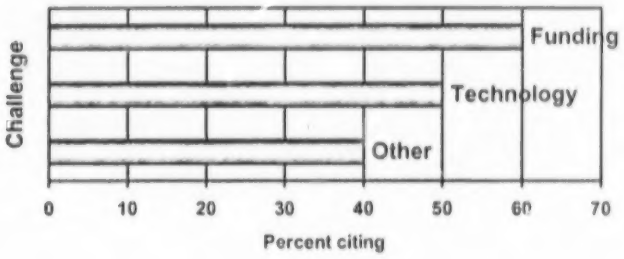
accredited virtual schools not yet counted, but is reasonable to **"guesstimate" the number of unduplicated K-12 students** enrolling in a virtual course in the U.S. in 2001-2002 at **between 40,000 and 50,000**. However, **better methods are needed to identify virtual K-12 schools, and to count their students and enrollments.**

Students enrolled, K-12 Virtual Schools



Barriers to success. The virtual school peer group was asked if there been special challenges or circumstances to overcome in starting their virtual school or making it a success. Over 60 percent of those providing open-ended responses cited funding issues, such as startup funding for staffing and technology, and costs of course creation and revision. Another frequently cited challenge was technology, including outdated infrastructure and the need to located appropriate courseware and software development tools. Finding qualified staff, coalition building and public relations were among other barriers noted by responding peers.

Special challenges to overcome, according to responding peer schools



Funding

Obtaining startup and continued funding is a key concern for many virtual schools. In the online survey, peer group schools were asked to identify their funding sources through open-ended responses. Besides self-funding through tuition or other methods, the most frequent funding source cited was state government. Some state legislatures provided direct funding to schools or their operating entities, while state education agencies provided funding based on enrollments, or

grant funding. Federal grants were also a funding source, along with foundation and corporate funding. A frequent approach was combining state funding with tuition. Responding schools reporting non-tuition funding received from one or more sources as averaging **$957,566** for the 2000-2001 fiscal year, and **$1,207,795** for the 2001-20002 fiscal year.

Tuition survey. Around 73% reported charging tuition, with those not charging tuition typically receiving state funding based on enrollments, or grant funding, to cover virtual school expenses. These schools typically reported "free" enrollment for in-district students, or for in-state students. Many schools combined state funding and tuition. All responding schools that provided out-of-district, out-of-state or other instruction for students not funded through their regular funding model reported charging tuition for these services. The range of tuition charges reported for semester-length courses, and average charges for the highest tuition charged (generally to out-of-state students) are presented below. Several schools, mostly those operating on the quarter system, reported 1.0 Carnegie Units (full year course) as their basic course unit, and some divided tuition into four quarterly payments. Their tuition rates were not included in calculating the table below.

Tuition for 1/2 Carnegie Unit (Semester Course), Responding Peer Schools

Type of school	Low	High	Mean
All VS	**$78**	**$385**	**$264**
State-Level VS	$300	$385	$333
U-based independent study VS	$78	$299	$164
District VS	$150	$350	$285

The most frequently cited one-semester tuition was $300, but less than 1 in 4 schools providing usable responses gave this figure. As reported in the previous study (Clark, 2000), major providers have sought to match tuition costs at about $300 a semester. This is even true of VHS Inc., which charges an annual fee of $6,000 to affiliated schools in return for 20 student enrollments.

There is a very wide variation in tuition charged, generally related to the nature of funding sources. The North Dakota Division of Independent Study charges out-of-state students $78 a semester course and in-state students $66, the same as for its regular independent study courses. At the other end of the spectrum, Michigan Virtual High School charges Michigan districts $385 a semester per pupil for its self-developed high school courses, and higher for foreign language courses from an external provider. However, context should be considered when comparing tuitions. For example, Michigan Virtual High School students must be enrolled in regular study through a Michigan high school to participate, which under state law allows districts to count two MVHS courses per pupil as part of regular instruction, while continuing to receive the same FTE funding. MVHS is also using grant funding to provide up to 2,000 AP course enrollments free to qualifying students in participating districts in 2001-2002. In general, university and state-based independent study programs that have added a virtual school option charged out-of-state residents the least, state-level schools the most, and schools run by local education agencies charged an amount in between.

Technology

Course development. Almost 8 in 10 virtual schools indicated that they developed or co-developed at least some of their own courses. Only about 12 percent of virtual schools said they relied entirely on external providers for their courses.

Who developed courses offered

Apex Learning and Class.com and were most frequently cited for-profit external course providers by our online peer group of 33 schools, while Blackboard and eCollege were most frequently cited as delivery platforms. Other for-profit course or content providers cited by more than one school included Academic Systems, Intelligent Education, NovaNet, eHarcourt ChildU, and Boxer Math. The most frequently cited nonprofit school-based provider was the Florida Virtual School, with other "provider schools" cited including Stanford EPGY and the Internet Academy (Federal Way, Washington). Macromedia tools were most commonly cited for web course development, with a wide variety of HTML editors and other development tools reported.

A majority of virtual schools appear to be using web- or Internet-based instruction as their only distance learning method. Of course, many are part of organizations that offer conventional, face-to-face education as well. Some schools require on-site meetings or offer optional group activities such as field trips. Independent study programs that have added web-based courses generally offer many of the same courses by both methods. In addition, print-based study guides traditionally associated with independent study are used by some schools.

Some virtual schools, especially state-level ones, market their courses as one part of a blend of technology-based options for high school credit. In Utah, this convergence is complete, with all delivery methods packaged through the same broker, the Electronic High School, while in Kentucky, the delivery methods are seen as separate but delivered via a common medium, the Kentucky Educational Technology System.

However, some incorporate video-based distance learning directly into courses, such as the Oakland Virtual Connection in Michigan, which uses its videoconferencing network to deliver course components. Video streaming capabilities are also allowing more virtual schools to incorporate video-based instructional materials into their web-based programs. Some of the peer

group schools send CDs or DVDs to students to use as part of their course delivery. Many virtual schools moved to the Internet in the first part of the 1990s after first offering this kind of computer-based individualized instruction.

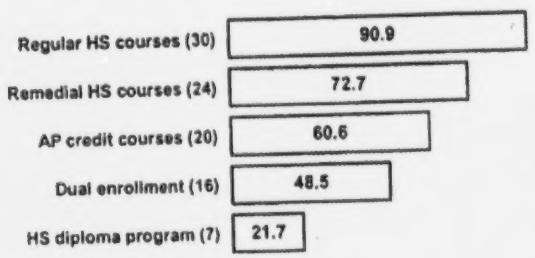
While most schools developing their own courses use development tools from external vendors, some have created their own proprietary systems. The University of Nebraska's Independent Study High School developed one of the best-known proprietary systems for use in developing its CLASS project courses, but this software is now "on the shelf" as part of an end-of-grant agreement with Class.com. Both Class.com and Nebraska ISHS are now developing new courses on different platforms.

Curriculum

Several survey items were related to the curriculum of the peer group schools, including course options, numbers of courses and AP courses offered, and AP course subjects.

Supplemental use. A majority of peer group schools indicated that a primary focus was on providing supplemental high school curriculum, and nine in 10 were offering regular core or elective high school courses. Over seven in ten offered remedial or makeup high school courses, while about half said they offered dual enrollment course options. Only about 22 percent said that they offered high school diploma programs as an option for study.

Percent offering course options



Through their responses on other survey items such as their statement of vision or purpose, many schools indicated they were following models in which virtual courses were primarily intended for use within regular instructional time in public K-12 schools. It should be noted that the selection of state-approved or regionally accredited schools for the peer group probably influenced this result. Participating private and charter schools were more likely to focus on supplemental use for instruction of home schoolers. However, it appears clear that both supplemental home school and in-school students are participating in K-12 virtual courses.

Numbers of courses planned, 2001-2002, and AP courses currently offered

Type of course	N	Minimum	Maximum	Mean
Total courses offered, 2001-2002	30	5	137	47.9
Current AP courses	20	1	26	8.1

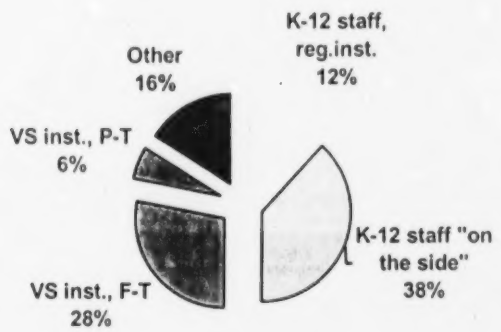
Advanced Placement courses. In the online survey conducted in July and August 2001, schools were provided with an online checklist of 27 Advanced Placement (AP) courses recognized by the College Board and asked to indicate the ones they currently offered. The most common AP course was Calculus AB, offered by one third of all 33 responding peers, and by over half of the responding schools that indicated they offered AP courses. AP English, Government & Politics, U.S. History, the two Economics courses, Physics B and Statistics were all reported to be offered by at least one in four responding schools. About 60% of the 33 responding peer schools said they would offer AP courses online in 2001-2002. Many planned to increase the number of AP courses they offered.

Individual AP courses offered by peer group schools

Result	Responses	Percentage
Calculus AB	11	33.3%
English	10	30.3%
Government & Politics	10	30.3%
U.S. History	10	30.3%
Economics-Macroeconomics	9	27.2%
Economics-Microeconomics	8	24.2%
Physics B	8	24.2%
Statistics	8	24.2%
Chemistry	7	21.2%
Biology	5	15.1%
Calculus BC	4	12.1%
Physics C	4	12.1%
European History	3	9.0%
Computer Science A	2	6.0%
Computer Science AB	2	6.0%
Human Geography	2	6.0%
Latin	2	6.0%
Psychology	2	6.0%
World History	2	6.0%
Art History	1	3.0%
Environmental Science	1	3.0%
French	1	3.0%
German Language	1	3.0%
Music Theory	1	3.0%
Spanish	1	3.0%
International English Language	0	0.0%
Studio Art	0	0.0%

Teaching. Virtual schools responding to the survey reported different models for instructional staffing. About half of peer group schools responding to the survey reported using K-12 teachers who taught full-time in a regular school. Of these regular K-12 teachers, about 3 in 4 held supplemental contracts with the virtual school, while the other quarter were teaching for the virtual school as part of their regular instructional duties in their school. About 3 in 10 schools

Course instructors, type used by percent



responding to the survey reported use of full time employees of the virtual school as instructors, while only about 6 percent said they used part-time instructors. The certification of teachers was not studied, but some noted that their teachers were certified in the subject areas they taught.

Details on Methods

Calculating enrollment estimates. Interpretation of responses to the enrollment questions in the online survey was complicated by several factors. Respondents were asked both for course enrollments and for unduplicated student enrollments for 2000-2001. It appears that many of the peer group schools count only course enrollments, which can be divided to yield full time equivalent students for purposes of determining state aid. Course enrollments are a simple head count of how many students enrolled in each course. An unduplicated count involves counting every student only once, no matter how many courses they are enrolled in. Many students are enrolled in more than one course every year. A ratio between unduplicated students and course enrollments was established for schools appearing to understand and give accurate information on both categories, and used to adjust enrollments reported by other schools.

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VIRTUAL SCHOOL PROFILES

State-Sanctioned "State-Level" Virtual Schools

There is considerable interest about the current status of "state-level" virtual school creation around the United States. A brief update on overall status is provided, followed by a more in-depth profile of one of the leading state-level schools. Those who are interested in learning more in depth about the evolution of state-level virtual schools may want to consult the first edition, published in March 2000, especially the State Profiles section, pp. 5-13. *Virtual High Schools: State of the States* can be found online at: www.cait.org/shared_resource_docs/vhs_files/vhs_study.pdf

By 2001, at least 14 states had virtual schools officially recognized by the governor, legislature or state education agency as "the" statewide virtual school. Florida and Michigan have a freestanding statewide virtual school (in Michigan's case, within a freestanding virtual university), funded through a legislative line item. Other statewide schools typically are operated by the state education agency, or by a consortium that includes this agency.

Year founded and organizational status, state-sanctioned state-level virtual schools

Free-standing, funded through legislative line item	Operated by a consortium, state education agency a partner	Primarily operated by a unit within state education agency		
Florida (1997)	Arkansas (2000)	Utah (1994)	Hawaii (1996)*	North Dakota (2000)
Michigan (2000)	Illinois (2001)	Louisiana (2000)	Kentucky (2000)	West Virginia (2000)
	Alabama (1999)	New Mexico (2001)	Maryland (2002)	Idaho (2002)*

* Hawaii re-established as a charter school in 2000; Idaho to be established as a statewide charter school in 2002

- **Alabama.** The Alabama Online High School began pilot instruction in fall 1999 and became available statewide in fall 2001. AOHS is a joint effort of the state education agency, University of Alabama, local schools and state education associations, funded through a federal Technology Challenge grant. It currently offers several high school courses within a 4 x 4 instructional model.
- **Arkansas.** Operations began in Spring 2000 for the Arkansas Virtual High School, which currently offers 13 locally developed core curriculum courses as supplemental instruction for students attending participating public high schools. Operated by an education cooperative with state education agency funding.
- **Florida.** The **Florida Virtual School** (previously the Florida Virtual School), begun in 1997, has been state funded as an independent entity. It offers a full online curriculum but not a diploma. The largest virtual school in terms of enrollments, it acts as a course provider for districts in Florida and other states.

- **Hawaii.** When federal funding ended for the state department of education's. Hawaii E-School in 2000, the Hawaii E-Charter was developed to replace it. The first statewide charter school, E-Charter offers a full locally developed curriculum and approved diploma study and is free to any qualified Hawaii high school student.
- **Idaho.** The Idaho Virtual High School, established through H. B. 317 in spring 2001, will be a state-operated charter school in which districts will receive the same state funding for in-district students who enroll.
- **Illinois.** The Illinois Virtual High School, operated by a broad consortium, began offering instruction in January 2001, with a focus on AP curriculum.
- **Kentucky.** The Kentucky Virtual High School began operation in January 2000 within the state department of education, with state legislative funding. It provides supplemental pre-college curricula for public middle and high schools, taught by certified regular K-12 staff. It currently offers over 40 courses, including 14 AP courses.
- **Louisiana.** The Louisiana Virtual Classroom was opened in fall 2000 by the state department of education with funding from the State Distance Learning Network. LVC follows the Concord VHS bartering model, and currently shares 11 courses among participating high schools.
- **Maryland.** The Maryland Virtual Learning Community will debut in fall 2002, operated by the state education agency. Its initial focus will be on high school instruction.
- **Michigan.** The Michigan Virtual High School, established by the legislature as part of the private nonprofit Michigan Virtual University, began instruction in fall 2000 with AP courses and added 20 core and elective high school courses in fall 2001.
- **New Mexico.** The New Mexico Virtual School, established by legislative act within the Department of Public Education, began instruction in January 2001 with initial AP course offerings, and now offers a full high school curriculum developed by an external provider. It has a long-term focus on all K-12 levels.
- **North Dakota.** The North Dakota Division of Independent Study began offering online high school courses in fall 2000, and now offers over 70 courses and an approved diploma.
- **Utah.** The Electronic High School began in 1994 funded by the State Office of Education. It acts as a course broker for high school courses offered through interactive television, public television and online. It currently offers 29 online core and concurrent enrollment courses developed with Utah Education Network.
- **West Virginia.** The West Virginia Virtual School within the state department of education began operation in fall 2000, with legislative and local district funding. Currently over 40 online courses at all K-12 levels, developed and delivered by external providers are brokered by WVHS to participating districts.

Profile: Florida Virtual School

Note: this extended profile is updated from the previous study (Clark, 2000).

The Florida Virtual School, originally the Florida Virtual School, began in 1997 as a cooperative effort between the Orange and Alachua county school districts. Its initial goal was to provide a complete high school online by the year 2001, including services that will enable students to successfully transition to postsecondary education institutions and to the workplace.

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FVS currently provides courses for students registered through all 67 Florida county districts, as well as many charter and private school and home schools. Its enrollments have expanded rapidly, from about 2800 in 1999-2000 to 5900 in 2000-2001, although the number of unduplicated students registered is not clear. FVS serves public, private and home school students. A focus on advanced coursework means that most students are high achievers, but special efforts to recruit students from rural and low-performing schools (often in low-income, high-minority urban areas) appear to be paying off. By 1999-2000, minority student participation has increased to about 17 percent.

In November 1999, the Florida Governor and Board of Regents agreed on the"One Florida" plan, which bans race and gender-based preferences in college admissions, and guarantees state university admission to the top 20 percent of students in every Florida Virtual School. One Florida also provided instructional technology funding to help low performing ('D' and 'F') high schools obtain the necessary computer equipment and Internet connectivity to access online courses. In accordance with legislation, FVS gives first priority to these students. Registration is opened to other public schools students, and to private school and home school students two weeks later.

As part of One Florida, a $2.4 million appropriation was made to the Florida Virtual School in FY 2001, to expand access to advanced college preparatory coursework, including Advanced Placement courses. Funded previously through the State Department of Education, FVS is now established as a separately funded free-standing entity. FVS received about $6.2 million in continued funding through a direct legislative appropriation for the 2001-2002 fiscal year. Numerous business partners have also supported FVS through in-kind donations and training.

Administrative Staff of Florida Virtual School include an executive director, chief academic officer, chief information officer and director of curriculum and instruction, as well as four regional directors and support staff. All faculty and staff positions with the school are full-time, as a result of issues encountered in working with part-timers. Administrative staff members work "virtually" with district coordinators. FVS teachers are all Florida certified in subjects they teach. Over 50 are currently employed, and live throughout the state. "FVS is fortunate to have passionate educators totally focused on student centered instruction and learning, as well as parent involvement," says Executive Director Julie Young.

FVS offered 60 high school courses online in fall 2001, including Advanced Placement and college preparatory courses, and a full core curriculum. The Florida Virtual School staff maintains contact with their students via the Internet, E-mail, and telephone. All courses are free to all students in the state of Florida. Supplemental course materials are provided to the student at no charge to use while they are taking a course. Students must register through an affiliated district, private school or charter school. Affiliated districts agree to accept credits from FVS, collaborate on AP exams, and provide a district coordinator.

While the school motto is "Any time, any place, any path, any pace," problems with course completion have led the school to replace their open pacing model with three alternative paces for completion - accelerated, standard and extended. "We had students who literally were in a one semester course for two years," said FVS Executive Director Julie Young. The three pacing options are linked to the semester system, with the extended option adding 9 weeks.

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FVS is building new courses with the e-Education platform developed by JonesKnowledge. If a student takes a FVS course from within a school setting, the affiliated school must provide access to a multimedia computer with Internet access. Students requesting the extended pace option (see below) must obtain both counselor and parental permission to ensure adequate online access. All courses must meet the content and achievement goals in the Florida Sunshine State Standards as well as pass a peer review by a team from the education and business community.

The school has developed an extensive in-house training and mentoring capacity. It has a philosophy of "teach first, develop later." New full-time teacher hires attend an extended on-site seminar, then teach an existing online course with online monitoring and feedback from a mentor who is teaching in the same course shell. Teachers learn to edit within the course as they teach it. After the course is completed successfully, they receive advanced training in course development and can submit a request to develop a class.

Young attributes the phenomenal growth of the Florida Virtual School to "a focus on continuous quality improvement, as well as our data driven success with student achievement." FVS began its needs assessment activities with a 1997 survey of Superintendents across the state, asking specifically about Advanced Placement offerings and needs, and other courses of interest, repeating this process yearly. They documented a strong need for AP courses, especially in rural areas, and in 1998-99 offered the top five AP courses requested by districts. Student needs and responses to courses are studied in mid-course and at course completion through surveys embedded in course content. Despite rapid growth, the AP exam pass rates of FVS students exceed the national average, according to research released by the school. The largest provider of online AP courses, Apex Learning, cites College Board statements that its students are also exceeding national pass rates, but has not released research to verify this contention. External evaluation activities have been conducted by Florida State University's Center for Teaching and Learning, which has submitted evaluation reports to the state legislature. FVS administrators believe the external evaluation has been helpful in meeting accountability concerns and receiving further state funding. Extensive public relations and dissemination efforts have helped the school keep a high visibility with state funders. Many states and several other nations have sent delegations to visit FVS. "If allowed," says Young, "virtual education will greatly enhance American education."

College and University-Based Virtual Schools

Profile: University of Nebraska Independent High School

The University of Nebraska Independent Study High School Online Diploma Program and CLASS.com. The University of Nebraska-Lincoln operates a large Independent Study High School, established in 1929 that had about 15,000 enrollments by 6500 different high school students in 1999-2000. Through a five-year, $15 million federal Star Schools grant and additional funding from the U.S. General Services Administration, the University's Department of Distance Education has led development of custom software and used it to develop 34 web-based high school courses so far, as part of a complete online high school curriculum. Tuition is $275 per course per semester. The proprietary software features streaming audio and video and interactive

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features, and is comparable in quality to commercial products. "The one thing we hoped would change is the bandwidth problem, " says James Schiefelbein, Assistant Director in the Department of Distance Education.

In July 1999, a for-profit company, CLASS.com, Inc., was created to market the University of Nebraska courses. It has a licensing agreement with the University, and in turn creates licensing agreements with other parties. Its most high-profile client to date is the Kentucky Virtual High School (see the KVHS profile for details). Other major universities with established Independent Study High Schools are also creating online diploma programs, including the University of Missouri, University of Indiana, and University of Texas. Brigham Young University is one of the largest private university providers of online high school study. In North Dakota, an online diploma program is being created through the Independent Study Division of the state department of education.

Consortium and Regionally-Based Virtual Schools

Consortia are also playing an important role in the growth of virtual schooling. The best known of these is the Concord Virtual High School, founded in 1997 by the Hudson (MA) Public Schools and the Concord Consortium, now operated by the nonprofit VHS Inc. The VHS™ is a unique cooperative in which schools across the nation have contributed a "netcourse" and in return received 20 student enrollments in any of over 100 VHS courses. Other virtual schools have adopted similar models, such as the long-running Cyberschool in Eugene, Oregon, and the Colorado Online School Consortium. In Illinois, Lewis and Clark Community College leads a dual credit partnership with area high schools that is expanding its efforts with a virtual high school, while the Connecticut Distance Learning Consortium is expanding its K-16 offerings with online courses. Two regional consortia of state governments, AP Nexus in the southeast and the Western Consortium for Accelerated Learning Opportunities, seek to expand access to Advanced Placement (AP) courses through virtual learning.

Profile: VHS Inc. (formerly Concord VHS)

The Concord Virtual High School. The leading model of a cooperative approach to virtual high school development is the Virtual High School administered by VHS, Inc., nonprofit successor to the previous administrator, the Hudson (Massachusetts) Public Schools. Development of the virtual school was been funded by a 5-year, $7.5 million federal Technology Innovation Challenge grant that ended in October 2001.

In 2000-2001, VHS reported about 3000 course enrollments in courses shared by 170 schools in its last year of "subsidized" status. By April 2001 VHS reported that 108 schools from 21 states had renewed their commitment, and by August course enrollment estimates for 2001-2002 exceeded those in previous years. This represents a great increase from 1998-99, when 35 schools were affiliated. The "barter" model of teach a class, enroll your students, has led to a wide variety of core and elective high school courses being offered, with 155 Netcourses™ developed by 2000-2001.

The Virtual High School has a major focus on core and elective high school curricula, and offers few Advanced Placement courses.

According to Liz Pape, VHS Administrator, schools are currently charged an annual membership fee of $6000 to sponsor a NetCourse in the VHS Course Catalog. The $6000 annual fee is a sustainability measure introduced to ensure continuation after the end of the grant. It represents $3000 per student enrolled, equivalent to the tuition charged by several of the state-level virtual high schools.

In return for membership, participating schools receive 40 student seats - 20 for the fall semester and 20 for the spring semester. A teacher at that school teaches a VHS NetCourse each semester to as many as 20 students from different states. This represents little change in the basic "barter" model over the last few years. In 2000-2001, affiliating schools paid $5,000 in their setup year, for training of one teacher and a site coordinator. Teachers train by attending the Teachers Learning Conference, a 26-week online NetCourse which prepares them to teach online and guides their work in developing their own NetCourse to teach in VHS. The school also offers a 15-week NetCourse to train teachers in using the VHS system to teach an existing VHS NetCourse. Developing an online professional development model that prepares teachers to teach in an online environment has been "one of the most challenging aspects" of VHS, says Pape.

The Virtual High School contracted with SRI International for annual external evaluations during its federal grant. The work with SRI led to the development of a variety of quality tools that are instructive for anyone starting a virtual school. Pape encourages the wide use of VHS administrative agreements and planning and evaluation structures, which are posted to the Web through their site.

The large scale of the course cooperative also causes challenges in terms of providing services such as grading and registration to the many participating schools, says Pape, since so many of them are on on different calendars. The greatest numbers of affiliated districts can generally be found in states in the eastern U. S. VHS has also developed state-level agreements that subsidize local school participation in several states. Other virtual schools have since developed their own cooperatives based on the "Concord VHS Model," including CyberSchool in Eugene Oregon, one of the virtual school pioneers, and the Arkansas Virtual High School.

Local Education Agency-Based Virtual Schools

Many local education agencies have also opened virtual schools mainly intended to provide alternative or supplemental education for in-district students. The Internet Academy, operated by the Federal Way, Washington public schools, serves primarily in-district home school students. Some are offering online summer school courses for the district's students, such as Spring (Texas) ISD's eBranch. Some regional education agencies provide access to virtual courses, usually from third party vendors, as one of their many services to districts. These providers include Virtual Greenbush in Kansas, Lancaster-Lebanon IU 13 in Pennsylvania, the Texas Virtual School, and the Minnesota Distance Learning Academy.

Profile: HISD Virtual School

Houston Independent School District's HISD Virtual School provides both online AP courses in participating district high schools, and a full middle school curriculum free during the regular school year to both in-school and in-district home-schooled students registered through a middle school. Out-of-district students pay at least $250 for courses. The middle school curriculum, while originally conceived to help address issues of high drop-out rates in this grade range, are also seen as a way to prepare some students for rigorous online high school courses later on. In addition, notes Project Manager Gaye Lang, " there is a shortage of web-based learning curriculum at this level." The district developed its own middle school curriculum. Middle school students who apply themselves to assigned coursework in the Virtual School "will definitely be orientated toward web-based course delivery methods and procedures," says Melba Martell of Houston ISD. Awareness of key "gatekeepers" -- middle school principals, counselors and teachers – is raised through regular communications in a Virtual School Promotion and Awareness program. There are currently over 300 student course enrollments through at least 15 participating middle schools. Before departing the district to become Secretary of Education, former Superintendent Rod Paige participated actively in the development of the HISD Virtual School, as part of his strategy to improve educational opportunities and bring home schoolers back into the district.

Profile: Mindquest (Bloomington, MN Pubic Schools)

Mindquest is an online school for adults and young adults who have left school, administered by the Bloomington, Minnesota Public Schools. Students enroll in the diploma, fast track, or credit makeup program. While it is an ungraded or "alternative" school, graduates of Mindquest's diploma program receive a regular state-approved high school diploma from a high school in the district.

Enrollment in Mindquest is restricted to students 17 or older. All qualifying Minnesota residents receive free tuition funded through state programs for alternative schooling or adult basic education. Out-of-state students ineligible for state aid pay $300 per semester-equivalent course. In-state students constitute about 95% of enrollments, says Williams. Most of these are persons behind in their coursework, and registered through the Diploma Program while a significant minority are in the Credit Makeup program. Williams attributes this mainly to problems in making recent GED graduates aware of the program. The recently added Fast Track program, which provides an accelerated diploma program for individuals holding GED's has been an enrollment disappointment so far. The program is relatively stable in size, enrolling about 300 individual online learners who had 535 course enrollments in 2000-2001.

The school develops its own interdisciplinary, inquiry-based courses with a master learning approach. The performance-based approach can be a barrier for learners used to traditional educational approaches. For example, in Documenting Change, students watch a PBS documentary videotape about a struggling farm family, and then develop a documentary project of their own. Some students are initially unprepared for " a process of learning that calls for making revisions rather than getting a grade on the first version of an assignment," according to Williams. She says that Mindquest teachers coach students through a process of drafts and revisions to a polished final product--a demonstration of growth and learning--in each course. The program uses FirstClass

software by Centrinity, a dial-up client-server application, for e-mail, chat and other communications, and posts course content on the Web. The students work back and forth beyond the two mediums. Age makes a difference in how successful students are. "Generally, the older the student, the more persistence," says Williams, who has some students their 40s or 50s. Most, however, are teens or young adults.

Virtual Charter Schools

Virtual charter schools are another emerging state-level phenomenon. The Hawaii E-School, one of the first statewide virtual schools, transitioned to Hawaii E-Charter in 2001 as its federal funding ended. The Idaho Virtual High School will be a state-operated charter school in which financial apportionment per pupil to local school districts from general education revenue is based upon student completions of the school's virtual courses. Most virtual charter schools, however, are operated by local or regional education agencies. Some states allow operation by non-profits, such as eCOT, the Electronic Classroom of Tomorrow, Ohio's largest charter school, enrolling about 2800 students, and by for-profit entities. One of the longest-running charters is Basehor-Linwood Virtual Charter School, established in 1997 in Kansas, a state where participation in statewide virtual charter school activities is at the discretion of local districts. In most of the 38 states with charter school legislation, general revenue funding follows the student out of district to the district operating the charter school, with such discretion about participation. In Pennsylvania, legislation requiring the district of a student's residence to pay directly for virtual charter school attendance, including for home schoolers not previously registered in-district, has left districts refusing to pay for unexpected billings for which they cannot budget. The main target audience of the virtual charter schools is homeschoolers. In spring 1999, an estimated 850,000 students nationwide were being homeschooled (U.S. Department of Education, 2001b). A new for-profit school called K12, headed by former secretary of education William Bennett, will operate virtual charter schools for early elementary grade home schoolers in Pennsylvania and four other states through agreements with existing districts. It is reported that K12 hopes to enroll 15,000 students in Pennsylvania alone within 4 years, as it expands grade levels offered (Woodall, 2001). This new virtual school builds on the experience of private schools serving elementary home schoolers through independent study materials, such as the American School in Chicago.

Profile: Basehor-Linwood Virtual Charter School

Now in its fourth year, Bashor-Linwood Virtual Charter School in Kansas focuses on providing state-funded public education opportunities for K-12 home schoolers across the state. About 3 in four students are home schooled, and most others are at-risk youth or homebound. In-school students can only attend with the permission of their principal. Founded in 1998 by Kansas United School District No. 458, the virtual school is approved through the district by the state board of education. VCS Director Brenda DeGroot says that the mission of the VCS is to "create and develop alternative approaches to delivering educational processes."

This virtual charter school delivers self-developed courses in a full diploma program, using a certified district teacher in each elementary grade level and secondary content area. The program is free for Kansas residents. The instructional model has led to stable levels of participation, with

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about 365 course enrollments reported for 2000-2001. Students take proctored course exams, and must complete annual state assessments linked to student learning standards on the school campus. I believe that there will always be and should be a place for children to go to school, a "traditional school," says DeGroot. "I think that the Virtual Charter School has provided just another alternative for children."

Private Virtual Schools

A wide range of non-profit and proprietary private K-12 schools have also entered the virtual education market. Virtual private schools primarily serve home schoolers. Few are accredited by one of the six regional accreditation agencies or have approval as a recognized diploma-granting educational program through their state education agency. Accredited virtual private schools include the KeystoneVirtual High School, which expands the reach of Keystone National High School, one of the oldest regionally accredited proprietary high schools in the nation. The Christa McAuliffe Academy emphasizes individualized instruction via courseware delivered over the Internet, with personal mentoring, and weekly cohort "classes" online. Other accredited schools include Laurel Springs School and WISE Internet High School, part of Richard Milburn School. Many private schools offer evidence of accreditation by an alternative accreditation body, but those obtaining high school diplomas from these schools may face challenges in establishing their equivalency with diplomas from regionally accredited or state approved schools, in seeking employment or university admission. However, many of these providers provide excellent resources for parents conducting home school instruction, who already faced those issues. Among the best known of these are the Clonlara Compuhigh, one of the first virtual schools, and the Willoway Cybershool.

Profile: Christa McAulliffe Academy

Christa McAuliffe Academy (CMA) in Washington state has offered Internet-based K-12 learning since 1995. CMA started 16 years ago with individualized mastery learning content delivered via independent study, using computers and CD-ROM for supplemental computer-assisted instruction. It went online in about 1995 moved as curriculum products supporting this delivery method became available. All the curricular products used by the school are designed or adaptable for use in mastery-based learning. "Finding high quality software that meets the standards we require was extremely difficult," says Principal Glen Blomgren. "We have developed much of our own material as a result." External curriculum providers include NovaNET, Plato, and ChildU.

Students select their own teacher-mentor, and meet weekly with their mentor and other cohort members in an online classroom. Students undertake online mastery-based learning curricula facilitated by the mentors, and may also meet in person for field trips, excursions and other activities.

CMA had 380 course enrollments and 74 courses in 2000-2001. It charges a monthly tuition fee of $225, and also offers Independent Study courses for $199 per semester credit or $299 per full credit. It sometimes contracts with school districts to provide these services for them. The school uses certified teachers, working part-time from locations around the U. S.

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Blomgren considers approval and accreditation recognized by public schools and universities to be "critical" in the success over time of CMA. For private schools, he notes, pursuing accreditation is a "hard process." The school holds regional accreditation and state approval, and is seeking cross-regional approval through the Commission on International and Transregional Accreditation (CITA).

The synchronous virtual meetings are one of the things that make the program unique. "We have found a high correlation between participating in our Virtual Classroom and succeeding in our whole program," notes Blomgren.

For-Profit Providers of Curricula, Content, Tools and Infrastructure

Course, content and platform providers, many of them for-profits, also play a critical role in the growth of the virtual school movement. Many of the early virtual schools combined Internet tools such as email, chat and FTP with computer-aided instruction techniques to deliver mainly text-based instruction. Many virtual schools today are basically "portals" that obtain their web-based courses from vendors or other virtual schools. A smaller number use vendor software and delivery platforms to develop their own courses, or co-develop them with vendors or other schools. One of the few virtual schools to create its own custom software and delivery platforms is Nebraska CLASS, which used a large multi-year grant to create proprietary web-based courses now a separate for-profit license product available through Class.com. Apex Learning, which was started in 1997 to offer web-based Advanced Placement courses and AP support tools, has since become a "builder and operator of virtual schools," like Class.com. Other major course and platform vendors, such as eCollege, have added a focus on K-12 to their primary focus on higher education.

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CONTEXT FACTORS

A number of context factors are influencing the development and growth of virtual schools, including demographic factors, public perceptions, education market forces, education market forces, technology access, curriculum equity, and government policies and actions.

There have been many studies and reports that include analysis of context factors influencing the development of distance and virtual learning at the K-12 level. Some are proprietary, but many are generally available. Thomas (2000) reviews policy, instructional and administrative barriers to implementing online high school instruction in *Web Courses for High School Students: Potential and Issues*. A special report by eSchool News (2001), *Virtual Schooling: A New Dimension to Learning*, provides insightful commentary on key issues by many recognized leaders in the field. Two online resources published in 2000 by the Wisconsin Department of Public Instruction: a paper for state policymakers called *Virtual Education--New Challenges, New Opportunities*, and a description of many leading virtual schools and some of their attributes, called *Virtual Schools and Programs Online*. In addition, major educational associations have looked into university and K-12 virtual schooling, and the Educational Technology Cooperative of the Southern Regional Education Board has provided a list of *Essential Elements for Web-Based Courses for High School Students* (SREB, 2001).

Demographic factors. Rates of participation in K-12 distance education courses delivered by satellite appear highest in rural and small schools. Over half of the schools participating in the Concord VHS, a virtual school collaborative, have enrollments under 800 students (U.S. Department of Education, 2000). K-12 student populations have continued to grow in many states, taxing conventional school facilities and staff resources. As evidenced by the survey results reported earlier in this study, many students in web-based and video-based courses appear to be taking their courses as part of regular instruction within a public school. Instead of replacing conventional schools, virtual schools appear to be expanding curricular options and extended teaching resources for students in those schools, and for students being home schooled.

Public perceptions. The attitudes of parents play an important role in determining K-12 student participation in distance and virtual learning. A Phi Delta Kappa poll of 1108 adults (Rose and Gallup, 2001) showed that 30 percent of respondents approved of allowing students to earn high school credits over the Internet without attending a regular school, compared with 41 percent who approved of homes schooling. The authors felt that this showed that the public "is less willing to embrace cyberspace instruction" (p. 42) than home schooling. However, those surveyed were not asked about students earning credits over the Internet while attending a regular school, which appears to be at least as common an arrangement in practice.

Education market forces. As described earlier in the previous section, many for-profit vendors are participating in the development of virtual schools. For these for-profit companies, K-12 distance and virtual learning is part of a multi-billion-dollar "education market" in which the interests of venture capitalists and shareholders must be weighed along with those of educational communities. These for-profit organizations work closely with state, regional and local education agencies, and play a role in changing planning and policy to promote the growth of virtual schools.

Technology access. Access to appropriate technology is needed for participation in virtual schooling. According to the United States Department of Education (2001a), about 98 percent of U.S. schools had Internet access in 2000, compared to 35 percent in 1994. This rapid rise can be attributed in part to the Education rate (E-rate) program, a federal program to develop Internet infrastructure in schools and libraries. Established in 1996, by 2001 it had provided $5.8 billion in support to E-rate applicants. Inequities in access to educational technology persist in schools. For example, the ratio of students to Internet-connected computers in 2000 was 9 to 1 in the poorest schools, where it had been 17 to 1 only a year earlier. However, the ratio was 6 to 1 for students in low-poverty schools. Rates of technology access have lagged behind in private schools. Low income students had less home access to the Internet, putting them at a competitive disadvantage. These inequities in technology access have serious implications for those seeking to provide equal access to virtual school opportunities.

Curriculum equity. Those concerned about equal education opportunities have brought a focus to equitable access to school curricula in recent years. One area of virtual school growth can be traced to a class action lawsuit against the state of California over access to Advanced Placement (AP) high school courses that can increase college opportunities for K-12 learners. A number of state departments of education have used a portion of their federal AP funding to purchase services from virtual school AP providers, and incorporated these AP courses into their statewide virtual schools to address curriculum access and equity issues. Lorenzo (2001) provides a good overview of the role of AP in state efforts to address equity concerns.

Government policies and actions. State and federal government and local education agency policies and actions have considerable influence on the growth of virtual learning. The federal government has traditionally seen educational technology and distance learning as tools for use in education reform and school improvement efforts (Clark and Else, 1998). A number of federal grant programs have supported the development of K-12 and virtual learning, as is evident in the some educational programs described earlier in this study. Federal grants spurred the development of the first large-scale experiments in virtual high school study. States have provided "pass-through" grants funded by federal education reform programs, in turn used for widespread experimentation at the local and regional level. State mandates on the compulsory nature of K-12 education and seat-time requirements for tax funding have influences in-school models of online learning.

Accreditation and certification are key issues that reside mainly at the state level. Regional accreditation agencies usually house their staff for each state in the state education agency, and work closely with program approval, teacher certification and other SEA staff. All states require virtual teacher certification in their own state, or cross-agreements when teachers are certified in other states that have the same effect. Without both regional accreditation and state approval, a virtual school housed in a particular state may have difficulty attracting students at the district level. Accreditation through one of the multi-state accrediting agencies, such as the North Central Association of Colleges and Schools, allows a virtual school to offer an accredited high school diploma that will be accepted by most colleges and universities. Virtual schools must also consider state-level approval of their instructional programs. Some high-quality virtual private school programs designed to serve home schoolers are ineligible for approval in their states simply

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because they lack physical facilities or resources. However, some have found ways to deal with these issues, such as the Christa McAuliffe Academy profiled earlier. Because of their role in providing instructional guidance and policy in schools, school districts play an important role in determining the success of virtual high school efforts. "The power is with [school guidance] counselors," says Jack Turner, Principal of CyberSchool. "If they are nervous about the credibility of the school offering, they will wave kids away from it."

Future federal support for educational technology innovations may be more targeted more directly to high-need districts. The educational technology programs of the U.S. Department of Education are proposed for consolidation into state block grants by the new administration, with formula application to needy districts replacing competitive grant proposals. This may stimulate the growth of school efforts, but the implications of these investments may not always be closely considered by Governors as they announce statewide virtual school efforts.

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SUMMARY AND RECOMMENDATIONS

Some key characteristics of virtual schools are summarized below, according to eight aspects of virtual high school organization: funding, technology; curriculum; teaching; student services; assessment; policy and administration; and marketing and public relations. These key characteristics were introduced in the previous study (Clark, 2000), and have undergone some revision. Because teacher professional development is not a central issue for most virtual schools, is has been removed from the list and is dealt with under a new aspect, Teaching, and confined to training for online instruction. Access and Equity is really a philosophy that should characterize all virtual schools, so it has been removed as a separate aspect and is instead covered where appropriate under the other aspects.

Virtual School Characteristics: Summary	
Funding	Funding is a key issue for virtual schools. Most obtain some funding through tuition, and it is a major funding source for virtual schools not part of regular public K-12 education. Those operated by public schools often receive state funding based on enrollments, but many states are still working through average daily attendance issues. State legislative appropriations and state grants are a common funding source for state-sanctioned, state-level virtual schools. State, federal and foundation grants, and funding from districts receiving services are also common. External funders often support virtual schools in order to promote equitable access to key curricula. "Barter" methods are used by in some consortia, where members trade a teacher-led course for student enrollments, and share consortium costs. A few schools have already closed due to funding interruptions, and sustainability strategies are a concern for many.
Technology	A majority of virtual schools appear to be using web- or Internet-based instruction as their only distance learning method, but some include other methods in their courses, or offer other courses by methods such as independent study or videoconferencing. A number of delivery platforms are used, although Blackboard and eCollege appear most common. Transparency, ease of use and interactive communications are key issues for learning interfaces. Many offer one-stop portals to multiple course providers or resources, which increase access but can decrease simplicity of use. Back end administrative tasks are handled with a variety of software. Many web course development tools are used, with Macromedia tools appearing to be the most common. In-house technical resources and the adaptability of development tool and delivery platforms to local conditions are important considerations for those developing their own courses. There are issues of equitable access to technology for K-12 learners at school and at home that may limit access to virtual schooling.
Curriculum	Almost all offer high school courses, but a growing number are offering middle and elementary school courses. Most provide courses as a supplement to regular instruction or home schooling, although a substantial portion of

	schools offer online diplomas. A wide range of required and elective courses high school courses are available, with many virtual schools offering AP courses. Curriculum equity issues drive some course selection.
Teaching	Schools are taking different approaches to online teaching, using regular K-12 instructors or virtual school instructors, or contracting out online teaching to other course providers. Teacher training occurs online and in person.
Student Services	The range and methods of providing student services vary considerably. When external courses are used, student support responsibilities are often shared across several entities, such as central course providers and local schools approving course credit. Some offer virtual library access, online counseling, and other virtual support, while others arrange in-person services.
Assessment	Many schools try to screen out students for whom online learning may not be appropriate, Many monitor online student progress and behavior, and provide timely feedback to help ensure student motivation and completion. Exams are usually proctored. Home and alternative virtual schools often use mastery-based learning methods, and some schools use performance-based assessment. Assessment includes regular performance reporting and evaluation activities. Data needs of funders and stakeholders should be identified early on and data collected as part of a regular, systematic process.
Policy and Administration	Partner entities, and internal units within the partners, appear to work well together in most successful virtual school efforts. Policy and administrative tasks are often time-consuming, including issues such as coordination across calendars and schedules. Many virtual schools draw upon the policies of leading virtual schools as models for their own policy development.
Marketing and Public Relations	Marketing efforts can be limited or extensive, and often are preceded by informal or formal needs assessment activities. Marketing activities target potential students and their parents, and also seek to influence key gatekeepers of student enrollments. Virtual schools seek to raise awareness and build credibility, and also to address issues related to perceptions of their competition with other education methods.

Based on an analysis of virtual school activities and trends across the United States, the following recommendations are provided for planners considering the establishment of virtual schools.

Recommendations for Virtual School Planners	
Funding	Consider funding implications early on, including the costs and benefits of participation in different models of virtual schools. Plan for costs of course development and revision. Seek to identify as early as possible the most sustainable funding mechanisms for your virtual school.
Technology	Consider all technology options, and think strategically and flexibly about technology over time. Seek to ensure transparency, ease of use and interactivity, and a focus on learning rather than technology. "One-stop" access to a variety of distance learning course options can maximize return on prior educational technology investments.

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Curriculum	Determine the course needs of targeted populations early on. In deciding whether to build or lease courses initially, consider the main purpose of your curriculum, the instructional model you support, and in-house capabilities. Review external courses and the costs and benefits of using them. Consider how programs and courses offered will support equitable access for learners. Provide orientation activities for new online learners.
Teaching	Consider a mix of online and on-site methods for teacher training, and draw where possible on the resources of existing schools and providers. Support and monitor online teachers, and provide timely feedback.
Student Services	Form alliances to provide student services, but keep relative roles and responsibilities clear. Seek to make the student services for virtual students equivalent in quality to those provided for face-to-face learners.
Assessment	To enhance retention and completion, pre-screen students through multiple methods, monitor online student progress and provide timely feedback. Provide similar monitoring and feedback for online teachers. Establish key data elements to monitor progress and effectiveness of the virtual school, create an internal performance reporting structure, and if you have external funding stakeholders, use external evaluation with reports timed to fit the funding cycle.
Policy and Administration	Work to achieve commitments, roles and responsibilities among partner organizations involved in the virtual school, and also between internal units participating in virtual school operation. Adopt and adapt from the policies and procedures of existing virtual schools, while seeking to ensure a good fit with the unique circumstances of your virtual school.
Marketing and Public Relations	Develop a comprehensive marketing strategy based on a needs assessment. Use the most appropriate media to reach students parents, and other key audiences, including important gatekeepers such as school counselors and administrators. Seeking to build awareness and credibility, while dispelling myths about virtual schools, and fostering cooperation.

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APPENDIX: VIRTUAL SCHOOL LIST

We are compiling a list of virtual schools. Your assistance is requested in identifying existing and emerging virtual schools not in our initial list.

For the purposes of this list, we define a "virtual school" as "an educational organization that offers K-12 courses through Internet- or Web-based methods."

Below is the hyperlinked version of our current list.

After reviewing the list, you may wish to go to the Virtual School List Survey web site, a site where you can suggest a school **NOT YET LISTED** or submit a comment, idea or lead about virtual schools.

WHAT'S NOT INCLUDED IN THE LIST

The Virtual School List includes only those entities which offer courses DESIGNED FOR K-12 LEARNERS and which offer at least some INTERNET- OR WEB-BASED CREDIT COURSES. Using email, chat or support web sites (like many conventional college courses these days) isn't considered to constitute a "web-based course" in the context of this Virtual School List. Computer-based courses using CD-ROMs or software loaded on the student's computer for the main course delivery, another common method, is also not considered a "web-based course" application in this context.

To suggest a NEW listing, open the Virtual School List Survey web site in a NEW WINDOW by clicking on the link below:

http://fs7.formsite.com/star/vschoollist/index.html

NOTE ON VALIDATING AGENCIES

We are creating two sub-listings for privately operated virtual schools: those that are state-approved or licensed, and/or hold regionally accreditation through one of the six regional accrediting agencies (North Central Association and others), and those that do not have this kind of state approval or regional accreditation. The latter listing includes home schooling organizations generally ineligible for this kind of approval, and private schools which have chosen not to pursue it. Updated information on state approval or regional accreditation status is welcome.

VIRTUAL SCHOOL SERVICE PROVIDERS

Since many virtual schools rely on for-profit companies for curriculum and virtual school infrastructures, we have included a listing of leading service providers after the list of virtual schools.

And other schools operated by state education agencies

Current listing:

Alabama Online High School
http://altair.pacers.org/AOHS.htm

Arkansas Virtual High School
http://arkansashigh.k12.ar.us/avhs_main.htm

Florida Virtual School (formerly Florida Online High School)
http://www.flvs.net

Hawaii E-School
http://www.eschool.k12.hi.us
The grant funding E-School has ended. See Hawaii E-Charter

Illinois Virtual High School
http://ivhs.org

Kentucky Virtual High School
http://www.kvhs.org

Louisiana Virtual Classroom
http://www.lcet.doe.state.la.us/distance

Michigan Virtual High School
http://www.mivhs.org
Includes Michigan State University (MSU) Online Noncredit AP courses

New Mexico Virtual School
http://www.nmvs.org

North Dakota Division of Independent Study
http://www.dis.dpi.state.nd.us/ISC/classes/OLCourses.html

Utah Electronic High School
http://www.ehs.uen.org

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West Virginia Virtual School
http://access.k12.wv.us/vschool

Upcoming state-level schools which have been announced, but for which no web site yet exists, include the Maryland Virtual Learning Community and the Idaho Virtual High School

Offering at least a partial K-12 curriculum through web-based courses

Current listing:

Brigham Young University Independent Study
http://coned.byu.edu/is/index.htm

Indiana University HS
http://www.indiana.edu/~iuhs

Oklahoma State University Extension, K12 Distance Learning Academy
http://extension.okstate.edu/k12.htm

Southwest Missouri State University eHighSchool
http://www.cnas.smsu.edu/e-highschool

Stanford University, Education Program for Gifted Youth
http://www-epgy.stanford.edu

University of Missouri-Columbia HS
http://cdis.missouri.edu/MUHighSchool/HShome.htm

University of Nebraska Independent Study HS
http://www.unl.edu/ishs
Now offers own courses, separately from for-profit Class.com

University of California UC College Prep Initiative (UC-Santa Cruz)
http://uccp.ucsc.edu

University of Texas High School
http://www.utexas.edu/cee/dec/uths

and other local education agencies

Current listing:

Babbage Net School (Eastern Suffolk BOCES, Port Jefferson, NY)
http://www.babbagenetschool.com

Birdville Virtual School (Birdville ISD, TX)

http://www.birdville.k12.tx.us/cf/Virtual/VirtSchl.htm

CAL Online (Clovis Unified Schools, CA)
http://www.clovisusd.k12.ca.us/learn/virtual/default.htm

CCS Web Academy (Cumberland County Schools, Fayetteville, NC)
http://www.ccswebacademy.net

Clintondale Virtual High School (Clinton Township, MI)
www.clintondalevhs.org

Cyberschool (Lane County Schools, Eugene, OR)
http://www.cyberschool.4j.lane.edu

Duncanville ISD Virtual School (TX)
http://www.duncanvillevschool.org

eBranch (Spring Branch ISD, TX)
http://ebranch.ws

eSchool (Plano ISD, TX)
http://www.planoisdeschool.net

Evergreen Internet Academy, Evergreen HS (Vancouver, WA)
http://www.egreen.wednet.edu

Gwinnett County Online Campus (Lawrenceville, GA)
http://gwinnettk12online.net

HISD Virtual School (Houston ISD, TX)
http://hs.houstonisd.org/virtualschool

Internet Academy (Federal Way Schools, WA)
http://www.iacademy.org

JeffcoNet Academy (Jefferson County Schools, Denver, CO)
http://204.98.1.2/online

Juneau Cyber School (Juneau Schools, AK)
http://jcs.jsd.k12.ak.us

Mindquest (Bloomington Schools, MN)
http://www.mindquest.org/index.html

Monte Vista On-line Academy (Monte Vista Schools, CO)
http://monte.k12.co.us

NetSchool (Hillsboro Schools, OR)
http://netschool.hsd.k12.or.us

Oakland Virtual Connection (OV Connect, Oakland Public Schools, MI)

http://www.oakland.k12.mi.us/ovconnect

Rock Hill School District #3 Virtual High School
http://www.rock-hill.k12.sc.us/departments/vhs

SeeUonline (Matanuska-Susitna Schools, Palmer, AK)
http://www.seeuonline.org

SK Online (Salem-Keizer Public Schools)
http://skonline.org

Southern Oregon Online School
http://www.jacksonesd.k12.or.us/it/soos/

VILAS (Vilas Interactive Long Distance Alternative School)
http://www.vilas.k12.co.us/vilas/vilas.htm

Virtual School @ Liverpool (Liverpool Central Schools, NY)
http://www.liverpool.k12.ny.us/virtual.html

Virtual High School @ PWCS (Prince William County Schools, Manassas, VA)
http://www.pwcs.edu/pwcsvirtualhs

Operated by state-chartered entities

Current listing:

Basehor-Linwood Virtual Charter School (Basehor-Linwood Schools, Linwood KS)
http://vcs.usd458.k12.ks.us/public

Choice 2000 On-Line School (Perris Union Schools, Perris, CA)
http://www.choice2000.org

Delta Cyber school (Delta/Greely Schools, Delta Junction, AK)
http://www.dcs.k12.ak.us:8001

E*COT Electronic Classroom of Tomorrow (Columbus, OH)
http://www.ecotohio.org

Hawai'i E-Charter (Honolulu, HI) (prev. Hawaii E-School)
http://echarter.k12.hi.us

Odyssey Charter School (Clark County Schools, Las Vegas, NV)
http://www.odysseycs.org

T.E.A.C.H.- The Einstein Academy Charter School (Jenkintown, PA)
http://www.teachcharterschool.org

Western Pennsylvania Cyber Charter School (Midland Schools, Midland, PA)

http://www.midlandpa.org/wpccs

State licensed or regionally accredited

Current listing:

Christa McAuliffe Academy (Yakima, WA)
http://www.cmacademy.org

Laurel Springs School (Ojai, California)
http://www.laurelsprings.com

Keystone Virtual High School (Bloomsburg, PA)
http://www.keystonehighschool.com

WISE Internet High School, Richard Milburn HS (Woodbridge, VA)
http://www.rmhs.org/page3.html

Of educational entities, non-profit and for-profit organizations

Current listing:

CONSORTIA

Virtual High School (Hudson Public Schools, Concord Consortium, Hudson, MA)
http://vhs.concord.org/website.nsf

AP Nexus (Southern Regional Ed Board -- GA, SC, TN)
http://www.apnexus.sreb.org

Western Consortium for Accelerated Learning Opportunities (WICHE states, Denver CO)
http://www.wiche.edu/proSvcs.htm

Colorado Online School Consortium (Leadville, CO)
http://www.cosc.k12.co.us

ECO 2000 Cyberschool Project (Aroostook Cty, Washburn, ME)
http://www.eco2000.org/consortium

Southern Oregon Online School
http://www.jacksonesd.k12.or.us/soos

REGIONAL EDUCATION AGENCIES

Lancaster-Lebanon Intermediate Unit 13 (Apex courses only; Lancaster, PA)
http://www.iu13.k12.pa.us/tech/Apex.html

Minnesota Distance Learning Academy (SW/WC Service Cooperatives)
http://www.swsc.org/mdla

Texas Virtual School (ESC 4)
http://www.texasvirtualschool.org

Virtual Greenbush (Southeast Kansas Education Service Center, Girard, KS)
http://www.virtualgreenbush.org

Including virtual home schools, other private schools

Current listing:

Abbington Hill School (Bricktown, NJ)
http://www.business.inc.com/abbingtonhillschool

Alpha-Omega Academy On-Line (Chandler, AZ)
http://www.welcometoclass.com

ChildU (Weston, FL)
http://www.childu.com

Compuhigh Online High School (Clonlara School, Fairmont, WV)
http://www.compuhigh.com

Dennison On-Line Internet School (Los Angeles, CA)
http://www.dennisononline.com

Eldorado Academy (Nederland, CO)
http://www.eldoradoacademy.org

Garden Schools (Branson, MO)
http://www.gardenschools.com

International High School (San Diego, CA)
http://www.internationalhigh.org

Internet Home School.Com (Prescott, AZ)
http://www.internethomeschool.com

Oak Meadow Online School (Putney, VT)
http://www.oakmeadow.com/OnlineSchool2.htm

The Potter's School (Ledyard, CT)
http://www.pottersschool.com

Regina Coeli Academy (Tucson, AZ)

http://www.ewtn.com/rca

Scholars' Online Academy (Tucson, AZ)
http://www.islas.org

Sycamore Tree Online (Costa Mesa, CA)
http://www.sycamoretree.com

The Trent Schools (Bloomington, IN)
http://www.theschools.com

Willoway CyberSchool (Reading, PA)
http://www.willoway.com

Offering curriculum, content, virtual school infrastructures for customers nationally

Current listing:

Academic Systems
http://www.academicsystems.com

Apex Learning (Bellevue, WA)
http://www.apexlearning.com

Blackboard (Washington, DC)
http://www.blackboard.com

ChildU
http://www.childu.com

Class.com (Lincoln, NE)
http://www.class.com

eClassroom (eCollege, Denver, CO)
http://www.eclassroom.com

eEducation (JonesKnowledge.com, Englewood, CO)
http://eeducation.com

Intelligent Education, Inc.
http://www.intelligented.com

K-12 (McLean, VA) (see also Pennsylvania Virtual Charter School)
http://www.k12.com

Lotus (LearningSpace)
http://www.lotus.com

Macromedia University
http://macromedia.elementk.com/

NCS Learn (prev. Novanet, now part of Pearson Education) (Tucson, AZ)
http://www.novanet.com

Northwest Cyberschool
http://www.northwestcyberschool.com

Scholar Classical Tutorials
http://www.schola-tutorials.com/internet.htm

WebCT (Lynnfield, MA)
http://www.webct.com/

U.S. Department of Education
Office of Educatonal Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

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